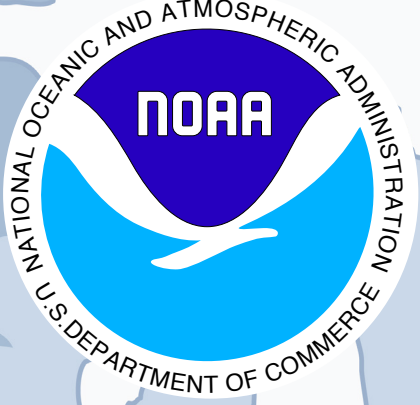


# Guide to the Great Lakes Region

FEBRUARY 2016

# INTRODUCTION

The Great Lakes hold important environmental, economic, and cultural value for both the region and the nation. NOAA is proud to have a significant presence in the Great Lakes, where we contribute to groundbreaking studies, further collaboration among the region's agencies and organizations, and play a leading role in Great Lakes restoration. NOAA is committed to providing the critical tools and information needed to advance science to stewardship and protect this vital resource.

This guide has been developed for NOAA staff and leadership working with the Great Lakes region. It contains key information about the Great Lakes, regional governance, and stakeholders. We hope that you will find it a helpful resource as you navigate the Great Lakes.

**ADDITIONAL INFORMATION**

For questions about this guide and NOAA's work in the Great Lakes, contact:

Jennifer Day, Regional Coordinator
734-741-2266
jennifer.day@noaa.gov

GLERL
Great Lakes Environmental Research Laboratory

NOAA Great Lakes Environmental Research Laboratory
4840 South State Road
Ann Arbor, MI 48108
www.glerl.noaa.gov

# KEY NUMBERS

**VOLUME:** The Great Lakes hold 6 quadrillion gallons of fresh water; this constitutes 20% of the world's fresh surface water and 95% of the U.S. supply.

**AREA:** The water surface area of the Great Lakes is more than 94,000 square miles—larger than Maryland, Virginia, West Virginia, and New Jersey combined. The total Great Lakes basin is 295,200 square miles.

**MAXIMUM DEPTHS:** Lake Superior - 1,333 feet, Lake Michigan - 924 feet, Lake Ontario - 802 feet, Lake Huron - 756 feet, Lake Erie - 210 feet.

**COASTLINE:** 4,530 miles of U.S. coastline, more than twice the length of the nation's Atlantic coastline.

**ECONOMIC IMPACT:** The lakes directly sustain more than 1.5 million jobs and generate $62 billion in annual wages. Despite the economic downturn, in 2009, the region was responsible for 27% of the U.S. GDP and 24% of its exports. The Great Lakes region's GDP in 2015 was $5.8 trillion, or 28% of combined U.S. and Canadian activity.

**NATURAL RESOURCE:** The Great Lakes provide drinking water to 40 million people in the U.S. and Canada. They also provide 56 billion gallons of water per day for municipal, agricultural, and industrial use. The Great Lakes' commercial and recreational fisheries contribute more than $7 billion to the regional economy.

## KEY NUMBERS (continued)

**DEMOGRAPHICS:**

**Population.** An estimated 105 million people, approximately 33% of the U.S. population, live in the eight states bordering the Great Lakes.

**Geography.** The Great Lakes are bordered in the U.S. by Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. The basin includes 158 U.S. counties and 13 major urban areas. In Canada, the basin includes the provinces of Ontario and Québec.

**Tribes.** There are 40 federally recognized American Indian tribes in the Great Lakes basin.

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# GREAT LAKES NATURAL RESOURCES

The value of the Great Lakes cannot be overstated. In combination, the Great Lakes contain 95% of the United States' fresh surface water. Their volume, at 6 quadrillion gallons, would submerge the continental U.S. under nearly 10 feet of water. At 94,000 square miles in area, the Great Lakes are the earth's largest single supply of fresh surface water. Sheer size and volume make the lakes an important and reliable source of drinking water, transportation, and power for the region and nation.

Beyond being a vital natural resource, the Great Lakes are an important part of the physical landscape, biological diversity, and cultural heritage of North America. Shared with Canada, these freshwater seas have over 10,000 miles of coastline and more than 30,000 islands. The ecosystem includes forest and wilderness areas (comprising approximately 52% of the basin), rich agricultural land (35%), extensive mineral deposits, thousands of tributary rivers, and tens of thousands of smaller lakes.

The region's sand dunes, coastal marshes, rocky shorelines, lake plain prairies, wetlands, and other landscapes contain features that are globally unique or best represented within the basin. The Great Lakes constitute the world's largest freshwater ecosystem, and their biological diversity is impressive. The basin is home to 3,500 species of flora and fauna and over 170 species of fish, many of which are globally rare or unique to this region.

Photo by **Tom Bellino**

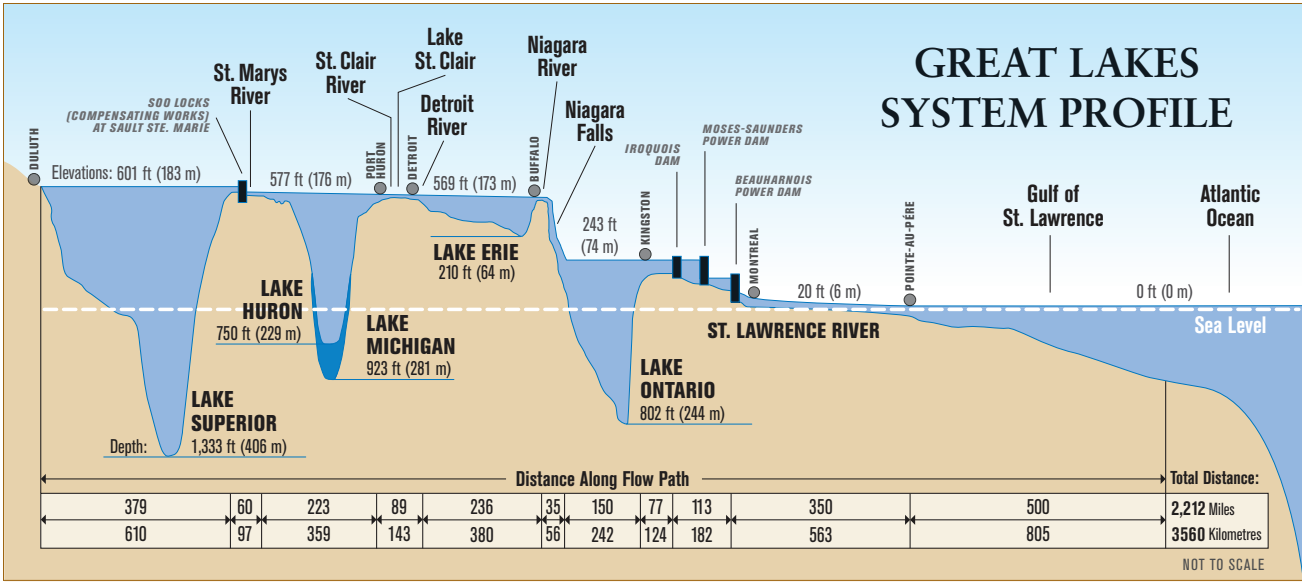



Diagram reprinted with permission, from The Great Lakes Basin Map, produced by **Michigan Sea Grant College Program, MICHU-11-705**, **Image 1.1**

# WATER LEVELS AND FLOWS

The Great Lakes are a system of interconnected lakes and channels beginning in Lake Superior. The 74-mile St. Marys River carries water from Lake Superior into Lake Huron. Lakes Michigan and Huron are joined at the Straits of Mackinac, which makes them a single hydrologic system. Water flows from Lake Huron through the St. Clair River, Lake St. Clair, and the Detroit River into the western basin of Lake Erie. Lake Erie, in turn, flows over Niagara Falls to Lake Ontario before flowing through the St. Lawrence River into the Atlantic Ocean. (Image 1.1)

The 2,340-mile St. Lawrence Seaway consists of locks, canals, and channels, and it allows vessels to travel from the Atlantic Ocean to all Great Lakes ports. Part of the St. Lawrence Seaway project, the Welland Shipping Canal and its system of locks raise vessels more than 326 feet to bypass the natural barrier of Niagara Falls.

The Great Lakes experience three types of water level fluctuations: short-term, seasonal, and long-term. Short-term fluctuations, called seiches, are similar to a storm surge. They are the result of strong weather events. Lake Erie is most susceptible; water level differences across the lake have been measured at more than 14 feet. Water levels also fluctuate in response to seasonal changes, with differences of 12-18 inches from winter lows to summer highs. Snow melt and spring rains cause water levels to rise and reach their peak in the summer. In the early fall,

evaporation and outflows begin to exceed inflow to the lakes, and water levels drop. The lakes are generally at their lowest during the winter months. Long-term fluctuations occur over decades. Lakes Michigan and Huron have experienced fluctuations of up to five feet. Lakes Superior and Ontario's water levels are managed.

# SOCIAL AND ECONOMIC CONTEXT

The Great Lakes are a major driver of the regional and national economy. Home to 13 major urban areas, the region also contains nearly 33% of the U.S. population. An interconnected waterway that stretches from Duluth, Minnesota out to the Atlantic Ocean, the Great Lakes system provides transportation for raw materials and finished goods as well as water to serve industry, electrical power, drinking water, and recreation.

Although the Midwest has suffered economic hardships in recent years, the region still generated 27% of the U.S. gross domestic product and 24% of the country's exports in 2009. A recent analysis by Michigan Sea Grant found that more than 1.5 million jobs are directly connected to the Great Lakes, generating $62 billion in annual wages. In Michigan alone, an estimated 23% of the state's payroll is associated with the Lakes, reports Michigan Sea Grant.

Additionally, according to a 2015 report by the U.S. Bureau of Labor Statistics, the Great Lakes states account for 15.8% of the total U.S. goods exports by trade dollar value, or $256.3 billion. Further, the Great Lakes Economic Forum reports that the region's GDP is $5.8 trillion, or roughly 28% of combined U.S. and Canadian activity.

Manufacturing is integral to the region, the source of 66% of Great Lakes-linked jobs in 2009. Tourism and recreation—a combination of birding, fishing, hunting, boating, diving, beach-going, skiing, and even surfing, among others—contribute to 14% of jobs. In fact, one-third of all registered boats in the U.S. reside in the Great Lakes basin and generate nearly $16 billion in spending each year. The region also draws 37 million anglers, hunters, and bird watchers annually.

Shipping and agriculture are each responsible for 8% of Great Lakes-related jobs. Over 200 million tons of cargo, primarily iron ore, coal, and grain, is shipped annually through the Great Lakes. Agriculture accounts for 7% of the nation's total food production and generates more than $15 billion each year in products.


Freighter *American Integrity* on the Great Lakes. Credit: NOAA.

# REGIONAL ISSUES

**Water Management –** The diversion of water from the Great Lakes to areas outside the basin is a contentious issue and the subject of litigation and legislation. The governors and premiers of Great Lakes states and provinces have developed a process for joint decision-making on future withdrawals and diversions through the creation of an interstate compact and regional body staffed by the Conference of Great Lakes and St. Lawrence Governors and Premiers.

**Water Levels –** NOAA is addressing water level management through multiple venues including understanding of historical trends and reasons for recent record low levels on Michigan-Huron, improving forecasting tools, and improving access to publicly-available water level information using state of the art visualization tools such as our Great Lakes Water Level Dashboard and Lake Level Viewer. Regional federal agencies (including NOAA/GLERL, the U.S. Army Corps of Engineers, and Environment Canada) continuously monitor and forecast Great Lakes water levels through a binational federal agency research-to-operations partnership. For example, the shoreline water level gauging stations throughout the Great Lakes are operated by both NOAA/NOS/CO-OPs and the Canadian Hydrographic Service (CHS). This network has contributed to one of the longest continuous sets of water level measurements for a large water body or coastal area on the planet. In addition, NOAA, the U.S. Army Corps of Engineers, and Environment Canada, through this ongoing research-to-operations collaboration, continue to develop, improve, and publicize monthly Great Lakes water level forecasts. The Coordinating Committee on Great Lakes Basic Hydrologic and Hydraulic Data, formed in 1953, meets bi-annually to discuss and coordinate regional federal agency efforts related to Great Lakes water levels and the regional water budget.

**Climate –** A changing climate presents unique challenges for the Great Lakes. Long-term studies conducted by NOAA show diminishing duration and thickness of ice cover. The 2014 National Climate Assessment forecasts changes in the range and distribution of important commercial and recreational fish species, increases in numbers and success of invasive species, declines in beach health, increases in harmful algal blooms, and declines in ice cover. Heat wave intensity, extreme rainfall events, and flooding are expected to increase, with negative impacts on transportation, agriculture, human health, and infrastructure. In light of these forecasted impacts, NOAA has developed resources that enable coastal community planners, conservation practitioners, and decision-makers to better adapt to and plan for the effects of climate change in their communities.

**Navigation –** The Great Lakes, connecting channels, and St. Lawrence Seaway are complex and interconnected navigation systems that include more than 130 specifically authorized federal harbors and channels. There is currently a backlog of dredging at federal harbors and channels. Funding for operation and maintenance of recreational harbors is not presently supported, which is a critical issue for harbor cities without commercial traffic. NOAA is a member of the Great Lakes Dredging Team, a joint federal/state partnership.

**Aquatic Invasive Species (AIS) –** Over 180 nonindigenous species have been identified as being established in the Great Lakes. More than 40% of these species were discovered after the 1959 opening of the St. Lawrence Seaway, which enabled ocean-going ships to enter the Great Lakes. Nonindigenous species are considered to be invasive when their introduction and spread cause economic or environmental harm or risks to human health. NOAA collects long-term ecological data, conducts fundamental research on ecosystem processes, and develops physical and ecological models to predict potential AIS impacts. In partnership with Sea Grant and USGS, NOAA maintains the Great

Lakes Aquatic Nuisance Species Information System (GLANSIS) database and supports work identifying the economic and environmental cost of potential invaders to the Great Lakes. Primary AIS pathways include maritime commerce, canals and waterways, organisms in trade, recreational activities, and public and private aquaculture, each requiring specific strategies to reduce the risk of AIS introduction and spread into the Great Lakes. NOAA is a member of the Great Lakes Panel on Aquatic Nuisance Species, a multi-jurisdictional entity committed to the prevention of Great Lakes aquatic invasions on a regional level. NOAA was involved with the Great Lakes Mississippi River Interbasin Study (GLMRIS) evaluating a range of options and technologies to prevent the transfer of AIS between the Great Lakes and Mississippi River basins via aquatic pathways.

**Areas of Concern (AOCs) –** AOCs include specific, listed harbors, tributaries, and watersheds that have experienced significant environmental degradation as defined in the Great Lakes Water Quality Agreement. Remedial Action Plans (RAPs) have been developed and implemented for the AOCs in the Great Lakes. A variety of government and nongovernmental entities are working on cleanup; the Great Lakes Restoration Initiative (GLRI) has provided significant financial resources to advance progress toward restoration. NOAA is supporting several projects to restore and delist AOCs.

Zebra and quagga mussels are just two of the many invasive species that now dominate the Great Lakes ecosystem.

**Harmful Algal Blooms (HABs):** During warm weather, areas of the Great Lakes such as Green Bay on Lake Michigan, Saginaw Bay on Lake Huron, and in particular, the western basin of Lake Erie experience intense harmful algae blooms. Often, these blooms contain toxins such as microcystin, leading to the degradation of water quality and unsafe conditions for aquatic life and humans. This affects fishing, recreation, and especially municipal drinking water. NOAA is working to determine the factors controlling microcystin production and to develop methods for predicting location, intensity, and movement of HABs from satellite imagery and lake circulation. NOAA-GLERL's HAB bulletin provides a weekly forecast for these blooms in Western Lake Erie, while its HAB Tracker combines remote sensing, monitoring, and modeling to produce 5-day forecasts of bloom extent, intensity and movement. These real-time predictions are updated twice daily and can provide water intake managers, anglers, recreational boaters, and beach users timely information for decision-making.

**Contaminated Sediments –** Sediments in the Great Lakes reflect decades of point and nonpoint source pollution. Sediments with toxic contamination have become the primary factor limiting ecological restoration and recovery and are responsible for most of the beneficial use impairments (BUIs) found at AOCs. NOAA offers expertise in remedying contaminated sediment issues, including protective environmental dredging, capping, and natural attenuation. Cleanup and monitoring strategies are designed to reduce ecological risk. NOAA has developed a web-based, publicly accessible contaminated sediment database to expedite the development, implementation and monitoring of sediment cleanup and restoration projects.

**Wetlands and Aquatic Habitat –** The Great Lakes have lost more than half their original wetlands; these losses are continuing due to development. Habitat decline, combined with the introduction and spread of invasive species, contributes to the loss of native species. NOAA's Restoration Center and Office for Coastal Management (OCM) work to protect and restore coastal habitats and receive support through the GLRI.

**Resiliency** – As it is throughout the nation, making communities, ecosystems, and economies more resilient to current and future disturbance is of critical importance for NOAA. The agency's role spans from predicting conditions, supporting resilience planning, promoting green infrastructure, and otherwise connecting partners with the data, tools, and technical assistance to prepare for the unexpected, both directly and in partnership with keystone partners, like the coastal zone management programs.

**Green Infrastructure** – OCM, Sea Grant, and others within NOAA are exploring nature-based solutions to coastal flooding, erosion, and other coastal hazards. Pilots in Duluth, MN; Toledo, OH; and Rochester, NY have looked at recurring and catastrophic flooding and the role that green infrastructure might play in reducing that risk. Some of this early work has been the basis for developing a stepwise process that communities can apply to examine where and how much green infrastructure might be placed to address flooding.

Habitat restoration in Muskegon Lake, Michigan. Credit: NOAA.



# INTERNATIONAL COMMISSIONS AND TREATIES

**International Joint Commission (IJC) –** The 1909 Boundary Waters Treaty established the International Joint Commission (IJC) to assist the U.S. and Canada in preventing and resolving disputes over shared waters. The IJC maintains Section Offices in Washington, D.C. and Ottawa, Ontario. The IJC has six commissioners, three from the U.S. (appointed by the President) and three from Canada. In working to prevent or resolve disputes, each commissioner acts impartially rather than representing the views of his or her respective government. The IJC has established multiple boards and task forces, consisting of experts from Canada and the U.S., to help it carry out its responsibilities.

Gordon Walker
**Canadian Chair**

Richard Morgan
**Canadian Commissioner**

Benoit Bouchard
**Canadian Commissioner**

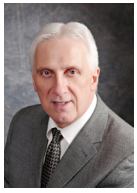
Lana Pollack
**U.S. Chair**

Rich Moy
**U.S. Commissioner**

Dereth Glance
**U.S. Commissioner**

Trish Morris

**IJC Great Lakes Regional office –** The Great Lakes Water Quality Agreement established an IJC office in Windsor, Ontario. Patricia "Trish" Morris is Director. IJC boards provide recommendations related to the GLWQA, including the Water Quality Board and the Science Advisory Board. GLERL Director Deborah Lee is a member of the Science Advisory Board Regional Coordination Council.



Robert Lambe

Marc Gaden

**Great Lakes Fishery Commission (GLFC) –** The GLFC was established in 1955 by the Canadian/U.S. Convention on Great Lakes Fisheries. NOAA has no fishery regulation in the Great Lakes; it is a state responsibility and coordinated by the GLFC. The Commission coordinates fisheries research, controls the invasive sea lamprey, and facilities cooperative fishery management among state, provincial, tribal, and federal management agencies. The GLFC is comprised of eight appointed commissioners split evenly between the U.S. and Canada. Its secretariat is based in Ann Arbor, MI. Dr. Robert Lambe is the Executive Secretary; Dr. Marc Gaden is the Legislative Liaison and Communications Director.

The GLFC is advised by U.S. and Canadian advisors and numerous expert and technical boards, including the Board of Technical Experts, Sea Lamprey Control Board , and Sea Lamprey Research Board. Partnerships between the GLFC and federal, state, provincial, tribal, and local agencies and organizations are realized through nine councils and committees that provide guidance and support to the commission. Each of the five Great Lakes additionally has a Lake Committee to determine fishing issues. Binational membership is appointed by the governors and premiers of jurisdictions bordering each lake.

Tim Eder

**Great Lakes Commission (GLC) –** The GLC is an interstate compact composed of governor-appointed or legislatively mandated representatives of the eight Great Lakes states. Ontario and Québec are associate members. The GLC is a public agency established by the Great Lakes Basin Compact in 1955; its purpose is to "promote the orderly, integrated, and comprehensive development, use, and conservation of the water resources of the Great Lakes basin." Current GLC Chairman is Jon W. Allan, from the Michigan Office of the Great Lakes. The GLC has approximately 20 full-time staff members located in Ann Arbor, MI, led by Executive Director Tim Eder. The GLC plays secretariat to the Great Lakes Panel on Aquatic Invasive Species. The GLC has partnered with NOAA on several habitat restoration projects.

# CONGRESSIONAL LEADERSHIP

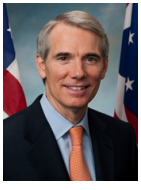
The **Great Lakes Congressional Task Force** is a caucus of 30 House and Senate members from the Great Lakes basin that jointly support Great Lakes environmental and economic issues and legislation. Matthew McKenna is Director of the Great Lakes Washington Program for the Northeast Midwest Institute and serves as Staff Director for the Task Force. The following Senators and Representatives are Task Force Co-Chairs:

**Co-Chair**
**Sen.**
Mark Kirk
**(R-IL)**

**Co-Chair**
**Sen.**
Debbie Stabenow
**(D-MI)**

**Co-Chair**
**Rep.**
Louise Slaughter
**(D-NY 25)**

**Vice Chair**
**Sen.**
Amy Klobuchar
**(D-MN)**



**Vice Chair**
**Sen.**
Rob Portman
**(R-OH)**

**Co-Chair**
**Rep.**
Sean Duffy
**(R-WI 07)**

**Co-Chair**
**Rep.**
Marcy Kaptur
**(D-OH 09)**

**Co-Chair**
**Rep.**
Candice Miller
**(R-MI 10)**



# REGIONAL POLICY

**The Great Lakes Restoration Initiative (GLRI)**
President Obama issued a campaign promise to protect and restore the Great Lakes. The pledge built upon the May 2004 Executive Order 13340 that created the Great Lakes Interagency Task Force and Regional Working Group to coordinate multi-agency federal restoration efforts. The resulting Great Lakes Restoration Initiative (GLRI) targets programs and projects to address the most significant problems in the Great Lakes. GLRI Focus Areas are:

- Toxic Substances and Areas of Concern
- Invasive Species
- Nonpoint Source Pollution Impacts on Nearshore Health
- Habitats and Species
- Foundations for Future Restoration Actions

NOAA, in concert with 15 other federal agencies, is actively participating in this initiative. NOAA has received more than $145 million between FY10 and FY15.

The **Great Lakes Water Quality Agreement (GLWQA)** between the US and Canada was Initially signed in 1972 and amended most recently on September 7, 2012. The GLWQA affirms the commitment of the U.S. and Canada to address critical environmental health issues and enhance water quality in the Great Lakes ecosystem. New provisions in the 2012 GLWQA address nearshore environments, aquatic invasive species, habitat degradation, and climate change effects. The GLWQA also supports continued work on existing threats to human health and the environment: harmful algal blooms, toxic chemicals, and discharges from vessels.

# NOAA IN THE GREAT LAKES


Deborah Lee


Jennifer Day

NOAA's Regional Collaboration model works to improve cooperation and coordination among NOAA Line Offices and partner entities to more effectively address collective regional challenges. It serves to support three primary functions for NOAA: integration, innovation, and engagement.

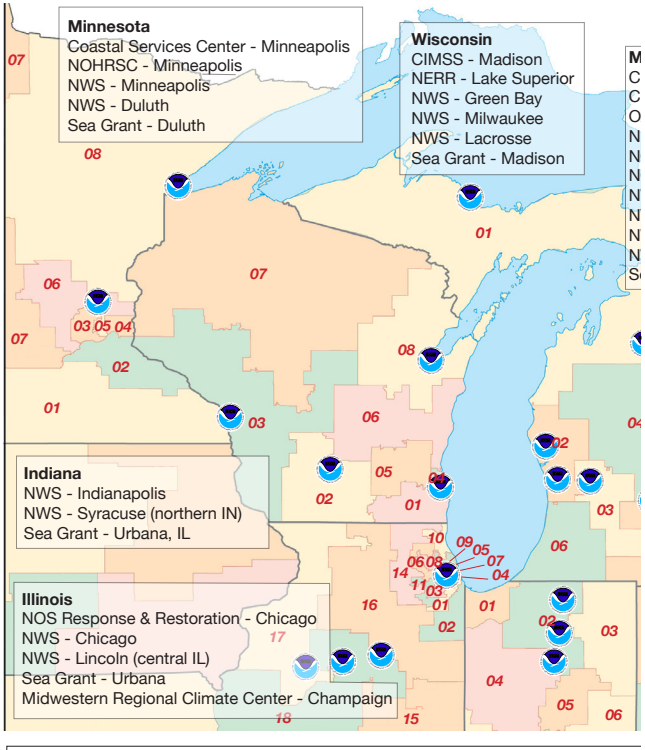
NOAA's Great Lakes Regional Collaboration Team (GLRCT) creates a means for NOAA to interact at regional scales, fosters new ideas on ways to better execute our mission, and facilitates development of new products and services that are responsive to changing economic circumstances, natural resources, and political pressures. The GLRCT reflects the diversity of NOAA's presence in the region and is strengthened by membership not only from NOAA's Line Offices, but also from multiple core partners.

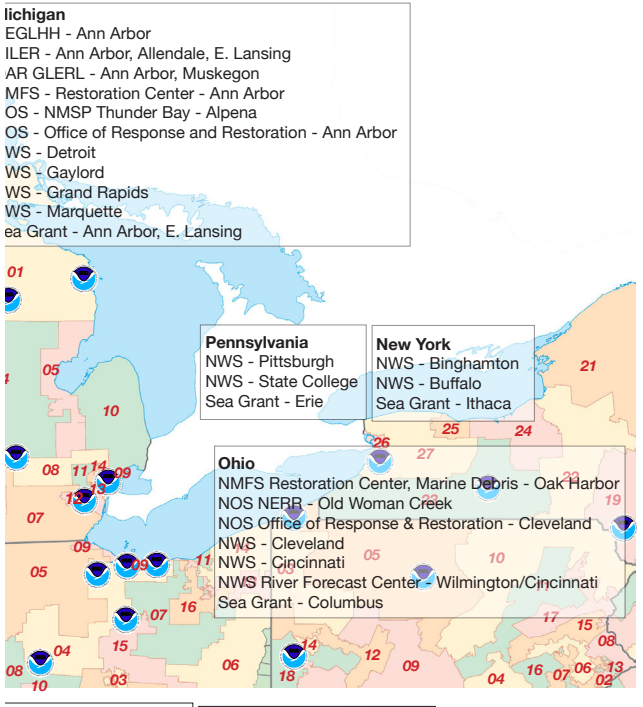
NOAA offices, programs, and partners in the Great Lakes include:

- NOAA Great Lakes Environmental Research Laboratory (Ann Arbor, MI)
- NOAA Lake Michigan Field Station and research vessels (Muskegon, MI)
- NOAA Thunder Bay National Marine Sanctuary (Alpena, MI)
- NOAA Center of Excellence for Great Lakes and Human Health (Ann Arbor, MI)
- NOAA Great Lakes Marine Debris Program (Oak Harbor, OH)
- NOAA Great Lakes Habitat Restoration Program (Ann Arbor, MI)
- NOAA/National Weather Service National Hydrological and Remote Sensing Center (Chanhassen, MN)
- NOAA/National Weather Service River Forecast Centers:
  - North Central River Forecast Center (Chanhassen, MN)
  - Ohio River Forecast Center (Wilmington, OH)
- NOAA State Coastal Zone Management Programs
- NOAA State Geodetic Survey Representatives
- NOAA National Weather Service Weather Forecast Offices:
  - Illinois: Central Illinois, Chicago
  - Indiana: Indianapolis, Northern Indiana
  - Michigan: Detroit/Pontiac, Grand Rapids, Marquette, Gaylord
  - Minnesota: Duluth, Minneapolis
  - New York: Buffalo, Binghamton
  - Ohio: Cincinnati, Cleveland
  - Pennsylvania: Pittsburgh, State College
  - Wisconsin: Green Bay, La Crosse, Milwaukee
- National Estuarine Research Reserves:
  - Lake Superior National Estuarine Research Reserve (Superior, WI)
  - Old Woman Creek National Estuarine Research Reserve (Huron, OH)
- Academic Cooperative Institutes
  - Cooperative Institute for Limnology and Ecosystems Research (Ann Arbor, MI)
  - Cooperative Institute for Meteorological Satellite Studies (Madison, WI)
- Midwest Regional Climate Center (Champaign, IL)
- Great Lakes Observing System (Ann Arbor, MI)
- State Sea Grant Programs: Illinois-Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin
- Great Lakes Integrated Science and Assessment (GLISA), Ann Arbor, MI

# NOAA in Your State

NOAA Great Lakes Regional Collaboration Team




**KEY:**

Numbers in red=U.S. Congressional district
CEGLHH=Center of Excellence for Great Lakes & Human Health
CILER=Cooperative Institute for Limnology & Ecosystems Research
CIMSS=Cooperative Institute for Meteorological Satellite Studies
NERR=National Estuarine Research Reserve
NMFS=National Marine Fisheries Ser
NMSP=National Marine Sanctuary Pr
NOHRSC=National Operational Hydr
NOS=National Ocean Service
NWS=National Weather Service
OAR=Office of Oceanic & Atmospher

vice
ogram
ologic Remote Sensing Center

ic Research

NOAA OAR
Great Lakes Environmental Research Lab (GLERL) Facility
Ann Arbor, MI

# FEDERAL AGENCIES


Charles Wooley

**Fish & Wildlife Service (FWS) –** A Department of Interior agency, FWS has field offices in the eight Great Lakes states. The FWS has a strong presence in the region and works closely with states, tribes, federal agencies, and other organizations to restore the Great Lakes. Tom Melius is Midwest Regional Director; Charlie Wooley is Deputy Regional Director.


Dr. Leon Carl

**U.S. Geological Survey (USGS) –** A Department of Interior agency, USGS has field offices located in each state. The Great Lakes Science Center, a USGS biological research facility, is located in Ann Arbor, MI. Dr. Leon Carl is Regional Executive for USGS programs in the Midwest. Norm Granneman is Great Lakes Regional Coordinator.

**National Park Service (NPS) –** A Department of Interior agency, NPS has eight units on the Great Lakes and five more in the watershed. Midwest Regional staff active on Great Lakes issues include Phyllis Ellin, liaison to the EPA, and Jerrilyn Thompson, Great Lakes/ Northern Forests Cooperative Ecosystem Studies Unit Manager at the University of Minnesota. The NPS Great Lakes Network Office is located in Ashland, WI.

**Natural Resources Conservation Service (NRCS) –** The NRCS, formerly known as the Soil Conservation Service, is a Department of Agriculture agency. It focuses largely on promoting conservation and stewardship among private landowners. Each state has an NRCS office led by a state conservationist. The Great Lakes basin spans the NRCS Central Region and Northeast Region.



**U.S. Forest Service –** A Department of Agriculture agency, the U.S. Forest Service manages lands and resources within national forests. The Forest Service's Region 9 (Eastern Region) is responsible for national forests in the Great Lakes. Anthony (Tony) Erba is the Director of Landscape Scale Conservation, and is based out of the Milwaukee office. Nick Vrevich is the primary point of contact and Great Lakes Restoration Program Manager, also Milwaukee-based.


Rear Adm. Ryan

**U.S. Coast Guard –** Under the Department of Homeland Security, the U.S. Coast Guard's Ninth District spans the Great Lakes. District headquarters are in Cleveland, OH. Rear Admiral June Ryan is Commander of the Ninth Coast Guard District, and Lorne W. Thomas is Government Affairs Officer.


A. Velasquez III

**Federal Emergency Management Agency (FEMA) –** FEMA Region V serves Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin, as well as 34 federally recognized tribes in Michigan, Minnesota, Wisconsin and New York. Andrew Velasquez III is Regional Administrator. He coordinates preparedness, response, recovery, and mitigation activities.

**Maritime Administration (MARAD) –** MARAD is an agency within the U.S. Department of Transportation. It provides grants and other assistance to states, local governments, and private interests for development of maritime transportation. MARAD focuses on the Great Lakes Gateway, which addresses commercial navigation in the Great Lakes. MARAD's Great Lakes Gateway office is located in Chicago; Floyd Miras is Director, and Carolyn Junemann is the point of contact.


Betty Sutton

**Saint Lawrence Seaway Development Corporation (SLSDC) –** Created in 1954, the SLSDC is a wholly owned government corporation created by statute to construct, operate, and maintain the St. Lawrence Seaway between the Port of Montreal and Lake Erie, within the territorial limits of the United States. Betty Sutton is Administrator.

**Federal Highway Administration (FHA) –** Located in the Department of Transportation, the FHA provides stewardship over the construction, maintenance, and preservation of the Nation's highways, bridges, and tunnels. It does so in coordination with state and local transportation agencies, plus federal transportation agencies involving federal and Indian lands.


Brig. Gen. Kaiser

**Army Corps of Engineers (Corps or USACE) –** The Great Lakes and Ohio River Division, located in Cincinnati, OH, is a regional business center for seven districts covering 335,000 miles and 17 states. Brigadier General Richard G. Kaiser serves as Commander of the Great Lakes and Ohio River Division; Tony Friona is the point of contact. In addition, the USACE has offices in Buffalo, NY, Chicago, IL, Detroit, MI, and Pittsburgh, PA.

**Environmental Protection Agency (EPA) –** EPA regional offices are aligned by state boundaries, with three regions responsible for the eight Great Lakes states. Region 5 (headquartered in Chicago) manages programs in Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. Region 2 (New York City) manages New York, and Region 3 (Philadelphia) manages Pennsylvania.


Chris Korleski

**Great Lakes National Program Office (GLNPO) –** An EPA office under the Division of Surface Water, GLNPO is located in Chicago. It coordinates U.S. efforts with Canada under the Great Lakes Water Quality Agreement (GLWQA). GLNPO brings agencies together under the strategic framework of the Great Lakes Restoration Initiative (GLRI) to accomplish the objectives of the GLRI Action Plan. It manages the Great Lakes Legacy Act, a grant program for sediment cleanup. GLNPO's director is Chris Korleski.

# GREAT LAKES STATES


Bruce Rauner

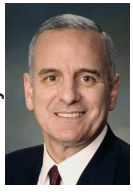
**Illinois –** The Great Lakes basin covers 1% of the state, but the majority of the Illinois population lives in or near this area. There are 63 miles of Lake Michigan coastline with six congressional districts. The Governor is Bruce Rauner (R). Wayne Rosenthal is Director of the Illinois DNR, and Jason Heffley is Chief of Staff.


Mike Pence

**Indiana –** About 10% of Indiana is in the Great Lakes basin. Indiana's governor is Mike Pence (R). Robert Carter, Jr. is Director of the Indiana DNR; Carol S. Comer is commissioner of the Indiana Department of Environmental Management.


Rick Snyder

**Michigan –** This is the only state entirely within the Great Lakes basin. Governor Rick Snyder (R) serves as chair of the Conference of Great Lakes and St. Lawrence Governors and Premiers, formerly Council of Great Lakes Governors. Bill Moritz is the interim Michigan DNR Director; Keith Creagh is the interim Michigan DEQ Director. Jon Allan is Director of Michigan's Office of the Great Lakes.


Mark Dayton

**Minnesota –** About 7% of the state is in the Great Lakes basin. Minnesota's governor is Mark Dayton (D). Tom Landwehr is commissioner of the Minnesota DNR; John Linc Stine is commissioner of the Minnesota Pollution Control Agency.


Andrew Cuomo

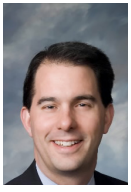
**New York –** About 34% of the state is in the Great Lakes basin. The governor is Andrew Cuomo (D). The acting commissioner of the New York State Department of Environmental Conservation is Basil Seggos.


John Kasich

**Ohio –** About 24% of the state is in the Great Lakes basin. The governor is John Kasich (R). Craig W. Butler is Director of the Ohio EPA; James Zehringer directs the Ohio DNR.


Tom Wolf

**Pennsylvania –** About 1% of the state is in the Great Lakes basin. Tom Wolf (D) is Pennsylvania's governor. The Pennsylvania Department of Conservation and Natural Resources secretary is Cindy Dunn. The secretary of the Pennsylvania Department of Environmental Protection is John Quigley.


Scott Walker

**Wisconsin –** About 30% of the state is in the Great Lakes basin. The governor is Scott Walker (R). Cathy Stepp is Secretary of the Wisconsin DNR.

# REGIONAL GOVERNANCE

**Great Lakes Regional Collaboration –** Formed in 2004 in response to Executive Order 13340, with representatives of federal, state, local, and tribal governments. The group developed a strategy for protection and restoration of Great Lakes in 2005 and oversees implementation. The Conference of Great Lakes and St. Lawrence Governors and Premiers staffs the collaboration.

**Great Lakes Interagency Task Force (IATF) –** Formed by an Executive Order 13340 from President Bush in 2004, the IATF includes secretary-level representatives from nine federal departments and agencies. The IATF now coordinates federal policies and actions in the Great Lakes region, including the GLRI. The IATF is chaired by the EPA Administrator. Craig McLean, OAR Administrator, represents DOC-NOAA.

**Regional Working Group (RWG) –** Subordinate to the Interagency Task Force with heads of federal regional offices. Deborah Lee, GLERL Director (OAR-GLERL), is NOAA's representative; Jennifer Day, Great Lakes Regional Coordinator, is the NOAA point of contact.

**Great Lakes Executive Committee (GLEC) –** A binational committee of federal, state, provincial, and tribal governments established to coordinate implementation of the GLWQA. Each of the ten GLWQA Annexes has a GLEC implementation committee. NOAA directly participates on six committees and Doug Kluck (NWS) co-chairs Annex 9: Climate Change Impacts. Deborah Lee, GLERL Director, is NOAA's representative.

**Great Lakes-St. Lawrence River Water Resources Regional Body –** A state and provincial coordinating organization established to oversee implementation of the Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement regarding joint management policies for water withdrawals and diversions. The Regional Body includes the Great Lakes Governors and Premiers of Ontario and Québec, or their designees.

**Lakewide Management Plans (LaMP) Committees –** Annex 2 of the Great Lakes Water Quality Agreement, as amended in 2012, stipulates that U.S. and Canadian Parties work with a broad set of stakeholders to 1) assess the status of each Great Lake, and 2) address environmental stressors that adversely affect the waters of the Great Lakes which are best addressed on a lakewide scale and using an ecosystem approach. Heather Stirratt serves as the NOAA representative on the Annex 2 Subcommittee and Task Team.

**Coordinated Science and Monitoring Initiative (CSMI) –** A collaborative effort between the United States and Canada, CSMI jointly addresses the top science and monitoring priorities for each lake. This plan builds upon the pre-established cooperative monitoring five-year cycle where intensive monitoring and field research occurs in one lake per year. During the remaining four years, lake-specific activities (sample analysis, data synthesis, identification of data needs, planning for CSMI monitoring) are conducted. Lake Superior is the focus of 2016 intensive monitoring.

**Great Lakes Panel on Aquatic Nuisance Species –** Convened in 1991 in response to the Non-Indigenous Aquatic Nuisance Prevention and Control Act of 1990, the binational panel identifies priorities, coordinates non-native species prevention and research control activities, and makes recommendations to a national Task Force on Aquatic Nuisance Species. Felix Martinez (OAR) is NOAA's Panel representative, Rochelle Sturtevant represents Sea Grant, and Peg Brady is NOAA's representative on the national task force.

**Coordinating Committee on Great Lakes Basic Hydraulics and Hydrology Data –** Binational committee of federal agencies, established to coordinate the collection and analysis of data used for monitoring and forecasting water levels and flows of the Great Lakes, connecting channels, and tributaries. NOAA is represented by Heather Stirratt (NOS) and Drew Gronewold (OAR).

**Great Lakes Observing Systems (GLOS) –** A binational nonprofit organization that collects and aggregates existing physical, chemical, biological, and geospatial data about the Great Lakes and St. Lawrence system from its partner organizations and makes that data accessible to the public. GLOS is a regional node of NOAA's Integrated Ocean Observing System (IOOS). Kelli Paige is Executive Director.



# REGIONAL STAKEHOLDER GROUPS


Dave Naftzger

**The Conference of Great Lakes and St. Lawrence Governors and Premiers –** The Conference of Great Lakes and St. Lawrence Governors and Premiers is a partnership of the Governors of the eight Great Lakes states and the Premiers of Ontario and Québec. It was formed in 1983 to encourage and facilitate environmentally sustainable economic growth. Interests include international trade, decision making on future water withdrawals and diversions, and regional collaboration. Michigan Governor Rick Snyder chairs the council. The Conference CGLG has a staff of five located in Chicago and is led by Executive Director Dave Naftzger.


David Ullrich

**Great Lakes – St. Lawrence Cities Initiative –** Initiated in 2003 by former Chicago Mayor Richard Daley, this group represents over 100 mayors and municipal leaders from U.S. and Canadian cities in the basin. Primary interests have been funding for wastewater infrastructure, beach closings, sediment cleanup, and separation of the Great Lakes and Mississippi River basins. Executive Director David Ullrich leads a staff of four in Chicago.


Jim Weakley

**Lake Carriers Association (LCA) –** Based in Rocky River, Ohio, the LCA represents 17 U.S. companies that operate 57 U.S. flag vessels on the Great Lakes. In a strong economy, these companies will annually move upwards of 115 million tons of dry-bulk cargo such as iron ore, coal, and limestone. Most U.S. flag "lakers" confine operations to Lakes Superior, Michigan, Huron, and Erie. Major issues facing LCA and its members are the introduction of non-indigenous species through ballast

water, adequate dredging of ports and waterways, and adequate Coast Guard ice breaking resources. Founded in 1880, LCA is among the oldest trade associations in the nation. James Weakley is President.

**Great Lakes Maritime Task Force –** Membership includes most of the ports, shippers, ship builders, maritime industries, and maritime labor organizations in the region. They advocate for Great Lakes waterborne commerce and related industries. John D. Baker of the Great Lakes District Council is GLMTF President.


Stuart Theis

**United States Great Lakes Shipping Association (USGLSA) –** This group represents the interests of shippers (domestic and foreign) that navigate between the Great Lakes and other ports worldwide. The Saint Lawrence Seaway is of critical interest to this group. The Executive Director is Stuart Theis.


Steve Fisher

**American Great Lakes Ports Association (AGLPA) –** AGLPA represents the interests of the public port authorities on the U.S. side of the Great Lakes. It works to inform public policies, primarily at the federal level, that foster maritime commerce and related employment in the region. This includes navigation maintenance and the new lock at Sault Sainte Marie. Executive Director Steve Fisher is based in Washington, DC.


Kathryn Buckner

**Council of Great Lakes Industries (CGLI) –** The Council of Great Lakes Industries is a nonprofit organization representing the interests of U.S. and Canadian industrial organizations with significant investments in the Great Lakes. Its mission is to promote sustainable development. The Council works to ensure that industry is a substantive partner in the region's public policy development process. The organization, based in Ann Arbor, MI, is led by President Kathryn Buckner and Chairman George H. Kuper.


Mike Shriberg

**National Wildlife Federation (NWF) –** NWF is a national environmental organization with a regional office in Ann Arbor, MI. Mike Shriberg is Regional Executive Director. NOAA, through the NMFS, currently partners with the NWF on habitat restoration projects.


Russ Terry


Gildo Tori

**Ducks Unlimited (DU) –** DU is an international nonprofit that supports conservation and restoration of wetlands and other habitat that is important to migratory waterfowl, other wildlife, and humans. DU provides planning, design, and restoration services for habitat restoration projects, serves as a policy advocate, coalition builder, grant administrator, and assists in habitat protection programs. Doug Gorby is Director of Conservation Programs at DU's Great Lakes/Atlantic Regional office in Ann Arbor, MI. Gildo Tori is Director of Public Policy.

**The Nature Conservancy (TNC)** – TNC is an international nonprofit organization that supports conservation of habitat for biodiversity. TNC's Great Lakes Project has identified six priority areas to build strategic success: aquatic invasive species, climate change adaptation, coastal and nearshore areas, aquatic food webs , northern forests, and watersheds. TNC has offices in each Great Lakes state; the Nature Conservancy of Canada is located in Toronto, Ontario. TNC is actively involved in habitat restoration and has partnered with NOAA through the GLRI. Dr. Patrick Doran, is the Associate State Director of the Michigan chapter; Denny McGrath is the Great lakes Project Director.


Todd Ambs

**Healing Our Waters (HOW)** – A coalition of more than 120 national and regional groups, HOW was created to advocate for Great Lakes protection and restoration. Formed in 2005, it is led by the National Wildlife Federation and the National Parks Conservation Association. The coalition also has a Technical Advisory Committee of Great Lakes researchers with which it consults. HOW receives funding from the Erb Family Foundation, Great Lakes Fisheries Trust, Joyce Foundation, Kresge Foundation, and the Wege Foundation. Todd Ambs is the Campaign Director at Healing Our Waters.


Joel Brammeier

**Alliance for the Great Lakes (AGL)** – AGL is North America's oldest independent Great Lakes citizens' organization. The group focuses on conservation and protection of Great Lakes resources. The organization is headquartered in Chicago and led by President and CEO Joel Brammeier. The Alliance also has staff through the region, including Buffalo, Cleveland, Detroit, Milwaukee, and Grand Haven (MI).


Jim Zorn

**Great Lakes Indian Fish & Wildlife Commission (GLIFWC)** – The GLIFWC is an intertribal agency representing the interests of 11 Ojibwe Indian nations with off-reservation treaty rights for hunting, fishing, and gathering in Michigan, Minnesota, and Wisconsin. The GLIFWC Executive Director is Jim Zorn; Ann McCammon-Soltis is Director of the Division of Intergovernmental Affairs, and Jen Vanator is Great Lakes Program Coordinator.

**Chippewa Ottawa Resource Authority (CORA)** – CORA includes six 1836 Treaty fishing tribes. In the 1836 Treaty, Ottawa and Chippewa Indian communities gave up land to the U.S. government but retained the right to hunt and fish in the treaty-ceded territory. CORA has board members and representatives from each community.

# INDEX OF ACRONYMS

ACRCC – Asian Carp Regional Coordinating Committee

AGL – Alliance for the Great Lakes

AGLPA – American Great Lakes Ports Association

AOC – Area of Concern

CGLG – Council of Great Lakes Governors

CGLI – Council of Great Lakes Industries

CILER – Cooperative Institute for Limnology and Ecosystem Services

CORA – Chippewa Ottawa Resource Authority

DNR – Department of Natural Resources

DOT – Department of Transportation

DU – Ducks Unlimited

EC – Environment Canada

EPA – Environmental Protection Agency

FWS – Fish and Wildlife Service

GLC – Great Lakes Commission

GLEC – Great Lakes Executive Committee

GLERL – Great Lakes Environmental Research Laboratory

GLFC – Great Lakes Fishery Commission

GLIFWC - Great Lakes Indian Fish & Wildlife Commission

GLMTF – Great Lakes Maritime Task Force

GLNPO – Great Lakes National Program Office (EPA)

GLOS – Great Lakes Observing System

GLRC – Great Lakes Regional Collaboration (interagency)

GLRCT – Great Lakes Regional Collaboration Team (NOAA)

GLRI – Great Lakes Restoration Initiative

GLRRIN – Great Lakes Regional Research Information Network

GLSA – Great Lakes Shipping Association

HOW – Healing Our Waters

IATF – Interagency Task Force

IJC – International Joint Commission

IOOS – Integrated Ocean Observing System

LCA – Lake Carriers Association

LaMP – Lakewide Management Plan

NESDIS – National Environmental Satellite, Data, and Information Service (NOAA)

NMFS – National Marine Fisheries Service (NOAA)

NOS – National Ocean Service (NOAA)

NRCS – Natural Resources Conservation Service (Agriculture)

NWF – National Wildlife Federation

NWS – National Weather Service (NOAA)

OAR – Office of Oceanic and Atmospheric Research (NOAA)

OMAO – Marine & Aviation Operations (NOAA)

PPI - Program Planning and Integration (NOAA)

RAP – Remedial Action Plan

RWG – Regional Working Group

SOLEC – State of the Lakes Ecosystem Conference

TNC – The Nature Conservancy

USGS – U.S. Geological Survey

# KEY CONTACTS

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